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PCT International Application

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CLAIMS 10/593448

1. A method for enhancing a first CT image composed
of a plurality of elements, each having an intensity
value in Hounsfield units indicative of a tissue type,
5   the method comprising:
     receiving (101) said first CT image,
     providing, by enhancement processing (103) based on
said first CT image, a plurality of copies of said first
CT image, said enhancement processing (103) being
10   performed with respect to predetermined intensity value
ranges, and
     combining (104) said plurality of copies of said
first CT image with said first CT image, whereby an
enhanced CT image is provided, said combining being based
15   on a classification with respect to intensity values of
regions within said first CT image and said plurality of
copies of said first CT image.

2. The method of claim 1, further comprising
receiving an indication of said predetermined value
20   ranges and associating said predetermined intensity value
ranges with said plurality of copies of said first CT
image.

3. The method of claim 1, wherein said enhancement
processing (103) is adaptive to a local structure defined
25   by at least some of said plurality of elements.

4. The method of claim 3, wherein said local
structure is defined by a group of elements whose
intensity values are within said predetermined intensity
value ranges.

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5. The method of claim 1, wherein said enhancement processing (103) comprises applying a non-linear filter to said plurality of copies of said first CT image.

6. The method of claim 1, wherein said enhancement
5   processing (103) is selected from a group consisting of a noise reduction using a low pass filter, a contrast enhancement using unsharp masking, a rank filtering, an adaptive filtering, a mean-shift filtering, a variational method, a multiband technique and a wavelet technique.

10   7. The method as claimed in any one of the preceding claims, wherein combining (104) said plurality of copies of said first CT image with said first CT image comprises:
             determining (1042) a first region mask for said
15   first CT image, said first region mask defining an area within the first CT image, whose elements have intensity values within a first intensity value range,
             determining (1042) a respective additional region mask for said plurality of copies of said first CT image,
20   said respective additional region mask defining an area within a respective copy of said first CT image, whose elements have intensity values within said predetermined intensity value ranges, and
             combining (1046) said first CT image and said
25   plurality of copies of said first CT image, weighted by their respective region masks, whereby said enhanced CT image is provided.

8. The method of claim 7, further comprising prioritizing (1041) said first CT image and said
30   plurality of copies of said first CT image, whereby an element of a CT image having a higher priority is

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included in the enhanced CT image and a correspondingly
located element of a CT image having a lower priority is
excluded from the enhanced CT image.

9. The method of any one of claims 7 or 8, further
comprising smoothing (1044) said region masks.

10. The method of any one of claims 7-9, further
comprising normalizing (1045) said region masks.

11. The method of any one of claims 7-10, further
comprising subjecting at least one of said region masks
to a morphological closing and/or opening algorithm.

12. The method of any one of the preceding claims,
wherein said first CT image is selected from a group
consisting of a two-dimensional array, a three-
dimensional array and a four-dimensional array.

13. The method as claimed in any one of the
preceding claims, wherein said first CT image is
subjected to a second enhancement processing prior to
said combining (104).

14. The method as claimed in claim 13, wherein said
second enhancement processing is performed with respect
to a second predetermined intensity value range.

15. A computer program product comprising software
code portions for performing the steps of any one of
claims 1-14, when said product is run on a computer.

16. A storage medium having stored thereon a
computer program product according to claim 15.

17. A propagated signal comprising components for
performing the steps of any one of claims 1-14.

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18. A device for enhancing a first CT image composed
of a plurality of elements, each having an intensity
value in Hounsfield units indicative of a tissue type,
the device comprising:

5   receiving means (2) for receiving said first CT
image,

        processing means (3) arranged for providing, by
enhancement processing (103) based on said first CT
image, a plurality of copies of said first CT image, said
10 processing means (3) being adapted for enhancement
processing with respect to predetermined intensity value
ranges, and

        means for combining (104) said plurality of copies
of said first CT image with said first CT image, whereby
15 an enhanced CT image is provided, said combining being
based on a classification with respect to intensity
values of regions within said first CT image and said
plurality of copies of said first CT image.

19. A method for enhancing a first digital image composed
20 of a plurality of elements, each having an intensity
value, the method comprising:

        receiving (101) a first digital image,
        providing, by enhancement processing (103) based on
said first digital image, a plurality of copies of said
25 first digital image, said enhancement processing (103)
being performed with respect to predetermined intensity
value ranges, and

        combining (104) said plurality of copies of said
first digital image with said first digital image,
30 whereby an enhanced digital image is provided, said
combining being based on a classification with respect to
intensity values of regions within said first image and
said plurality of copies of said first image.

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